

ABSTRACT OF THE DISCLOSURE

A duplex exchanger includes first and second heat exchangers each including a main flow channel and a cooperating counterheat channel. The first counterheat channel is joined to the first main flow channel for receiving a cooled primary stream therefrom. The second counterheat channel is also joined to the first main channel splitting the primary stream therefrom. An evaporative coolant is injected into the first counterheat channel, and an evaporative saturant is injected into the second counterheat channel. Heat from the initially hot primary stream in the first exchanger evaporates the coolant in the first counterheat channel for self-cooling the primary stream in the first main channel. Heat from a hot secondary stream channeled through the second main channel evaporates the saturant in the second counterheat channel for adding mass to the primary stream channeled therethrough.